ADVERTISEMENT FOR BIDS

Notice is hereby given that the City of Biloxi, Mississippi, will receive sealed bids at said City Hall, Second floor, Mayor's Office, until 10:00AM on the 20th day of August, 2014, for the following:

GEOTEXTILE FABRIC
PUBLIC WORKS DEPARTMENT

(Specifications will be available in the Purchasing Office, City Hall, 140 Lameuse Street, Biloxi, Mississippi (228-435-6252.)

BIDS SHALL BE DELIVERED TO THE MAYOR'S OFFICE, SECOND FLOOR, CITY HALL, 140 LAMEUSE STREET BILOXI, MISSISSIPPI, 39530.

Bids shall be in letter form with the envelope and bid plainly marked GEOTEXTILE FABRIC and shall be addressed to the Mayor's Office, P.O. Box 429, Biloxi, Mississippi 39533. The envelope should list all applicable state and local license numbers.

The City reserves the right to reject any and all bids and to waive any informality in the proposal accepted.

Published by the order of the Municipal Clerk, this the 29th day of July, 2014.

(SEAL)

Michelle A. Wescovick
Deputy MUNICIPAL CLERK

SEND PROOF OF PUBLICATION.

Publish: Twice: July 31 and August 7, 2014.

CITY OF BILOXI
PO BOX 429
BILOXI, MS 39533

REQUEST FOR BIDS

Deadline for Bids: **10:00am August 20, 2014**

ITEM #	QUANTITY	DESCRIPTION	SQUARE	YARD
a.		Geotextile Fabric for the City of Biloxi, as per		
		the enclosed minimum specifications. Bids		
		shall be for a delivered price. Unit price bids		
		shall be firm through May 6, 2015.		
		For any question, call the Purchasing Office, 228-435-6252		
		Bids on all commodities and equipment SHALL BE FOR A DELIVERED PRICE.		

*** A 'No Bid' is not necessary to remain on bidder's list. ***

** BIDS FOR ALL COMMODITIES / EQUIPMENT SHALL BE FOR A DELIVERED PRICE. **

Company Name: _____ _____

Address: _____

_____ _____

Phone: _____ Company Representative

Bids must be submitted in a sealed envelope and plainly marked:

"BID ON GEOTEXTILE FABRIC"

Mail this bid to P. O. Box 429, Biloxi, MS 39533 or deliver to the City Hall, 2nd floor, Mayor's Office, 140 Lameuse Street, Biloxi, MS 39530. The City reserves the right to reject any and all bids and to waive any informality in the proposal accepted.

ANCHOR REINFORCED VEGETATION SYSTEM FOR NON-STRUCTURAL EROSION CONTROL ON SLOPES

1 GENERAL

1.1 SUMMARY

A. The work for this section shall consist of furnishing all materials necessary for the installation of an Anchor Reinforced Vegetation System (ARVS) as a non-structural erosion control and/or slope protection solution.

1.2 UNIT PRICES

A. Method of Measurement: By the square yard, including seams, overlaps, anchor trenches, and wastage.

B. Basis of Payment: Supplier will be paid per square yard of material. This price is to include all necessary hardware and accessories to install the material properly regardless of the required anchor size and spacing. This price is only to include normal and approved applications of the ARVS system. Supplier is not expected to bid the product for extraordinary or unapproved applications.

1.3 REFERENCES

A. American Society for Testing and Materials (ASTM):

1. A 153 - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware
2. A 603-98e1 – Standard Specification for Zinc-Coated Steel Structural Wire Rope
3. A 1023 – Standard Specification for Stranded Carbon Steel Wire Ropes for General Purposes
4. B 85 – Standard Specification for Aluminum-Alloy Die Castings
5. B 240-10 – Standard Specification for Zinc and Zinc-Aluminum (ZA) Alloys in Ingot Form for Foundry and Die Castings
6. D 570 - Standard Test Methods for Water Absorption of Plastics.
7. D 6475 - Standard test Method for Measuring Mass Per Unit Area or Erosion Control Blankets.
8. D 6524 – Standard Test Method for Stiffness of Geosynthetics Used as Turf Reinforcement Mats.
9. D 6525 - Standard Test Method for Measuring Nominal Thickness of Permanent Erosion Control Products.
10. D 6575 – Test Method for Stiffness of Geosynthetics Used as Turf Reinforcements Mats (TRM's)
11. D 4354 - Practice for Sampling of Geosynthetics for Testing.
12. D 4355 - Test Method for Deterioration of Geotextiles from Exposure to Ultraviolet Light and Water (Xenon-Arc Type Apparatus).

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13. D 4439 - Terminology for Geotextiles.

14. D 6818 - Test Method for Ultimate Tensile Properties of Turf Reinforcement Mats.

15. D 4632 - Test Method for Grab Breaking Load and Elongation of Geotextiles.

16. D 4759 - Practice for Determining the Specification Conformance of Geosynthetics.

17. D 4873 - Guide for Identification, Storage, and Handling of Geotextiles.

18. D 6566 - Test Method for Measuring Mass Per Unit Area of Turf Reinforcement Mats.

B. Geosynthetic Accreditation Institute - Laboratory Accreditation Program (GAI-LAP).

C. International Standards Organization (ISO) 9001:2000 - Quality System Certification.

1.4 DEFINITIONS

A. *Anchor Reinforced Vegetation System (ARVS):* A soil protection system combining a High Performance Turf Reinforcement Mat (HPTRM,), Securing Pins, and Earth Percussion Anchors. The system protects soil surfaces from two failure mechanisms: surface erosion (non-structural applications) and shallow plane instability (structural applications).

B. *Certificate of Analysis (COA):* An official document certified by an authorized representative within the manufacturer's company that the manufactured synthetic turf reinforcement mat product(s) comply with the testing procedures and requisite results expressly stated within the Manufacturing Quality Control (MQC) program

C. *Certificate of Conformance (COC):* An official document certified by an authorized representative within the manufacturer's company that the manufactured synthetic turf reinforcement mat product(s) meet designated property values as manufactured in a facility having achieved ISO 9001:2000 certification, and tested in accordance with GAI-LAP procedures.

D. *High Performance Turf Reinforcement Mat (HPTRM):* A long-term, non-degradable RECP composed of UV-stabilized, non-degradable, synthetic fibers, nettings and/or filaments processed into three-dimensional reinforcement matrices designed for permanent and critical hydraulic applications where design discharges exert velocities and shear stresses that exceed the limits of mature natural vegetation. HPTRMs provide sufficient thickness, strength and void space to permit soil filling and/or retention and the development of vegetation within the matrix. The HPTRM MARV tensile strength per ASTM D-6818 is 3000 lbs/ft in the weakest principle direction.

E. *Manufacturer:* Entity that produces synthetic turf reinforcement mats through a process directly utilizing obtained raw materials, in a facility owned and operated by said entity, using equipment and assemblies owned and operated by said entity, subject to a certified Manufacturing Quality Control (MQC) Program. Upon completion of production, the manufacturer may sell the turf reinforcement mat product(s) directly to the customer, or through a vendor entity.

F. *Manufacturing Quality Control (MQC) Program*: A certified and documented program initiated and operated by the manufacturer that outlines the operational techniques and activities which sustain a quality of the synthetic turf reinforcement mat product(s) that will satisfy given needs.

G. *Minimum Average Roll Value (MARV):* Property value calculated as typical minus two standard deviations. Statistically, it yields a 97.7 percent degree of confidence that any sample taken during quality assurance testing will exceed value reported.

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H. *Percussion Driven Earth Anchor (PDEA):* A device designed to permanently stabilize soil via a metal cleat, flexible or rigid tendon, and load bearing plate. The anchor is driven through the HPTRM to the specified depth, and then tensioned appropriately to load-lock for desired pull-out resistance.

I. *Rolled Erosion Control Product (RECP):* A temporary degradable or long-term non-degradable material manufactured or fabricated into rolls designed to reduce soil erosion and assist in the growth, establishment and protection of vegetation.

J. *Securing Pin:* A device designed to temporarily hold the HPTRM in place while either vegetation establishes, or the installation of the HPTRM occurs. The securing pin offers no long term value to permanent tie-down of the HPTRM in an ARVS.

K. *Trilobal Monofilament Yarn:* A multi-dimensional polymer fiber consisting of a minimum of three points, providing increased surface area and grooves/channels along the fiber to capture additional moisture and sediment to enhance vegetative growth.

L. *Typical Roll Value:* Property value calculated from average or mean obtained from test data.

M. *Vendor:* An entity that provides synthetic turf reinforcement mat product(s) to a customer, on behalf of an independent manufacturer. A vendor does not manufacture the actual synthetic turf reinforcement mat product(s), and therefore is not subject to provisions of a certified MQC Program.

1.5 SUBMITTALS

1. Certification:

   a) The Contractor shall provide the Engineer a certificate of conformance stating the name of the HPTRM manufacturer, product name, style, chemical compositions of filaments or yarns and other pertinent information to fully describe the HPTRM.

   b) The Manufacturer is responsible for establishing and maintaining a Quality Control Program to assure compliance with the requirements of the specification. Documentation describing the quality control program shall be made available prior to the approval of the ARVS System for use on the project.

   c) The manufacturer's certificate of analysis shall state that the furnished HPTRM meets MARV requirements of the specification as evaluated under the manufacturer's quality control program. The certificate shall be attested to by a person having legal authority to bind the Manufacturer.

   d) The Contractor shall establish and maintain a quality control procedure to assure compliance of the ARVS with the requirements of the specification. Documentation describing the quality control procedure shall be provided to the Engineer.

2. Manufacturing Quality Control (MQC) test results shall be provided by the manufacturer for the HPTRM component of the ARVS prior to installation during the duration of the project as material is delivered to the jobsite.

3. Independent Performance Test Results shall be provided upon request.

1.6 DELIVERY, STORAGE, AND HANDLING

A. HPTRM labeling, shipment and storage shall follow ASTM D 4873.

B. Product labels shall clearly show the manufacturer or supplier name, style name, and roll number.

C. Each shipping document shall include a notation certifying that the material is in accordance with the manufacturer's certificate.

D. Each HPTRM roll shall be wrapped with a material that will protect the geotextile from damage due to shipment, water, sunlight, and contaminants. (This will be waived for HPTRMs having a 90% retention of strength after 6000 hours of exposure per ASTM D-4355.)

E. The protective wrapping shall be maintained during periods of shipment and storage.

F. During storage, HPTRM rolls shall be elevated off the ground and adequately covered to protect them from the following: Site construction damage, extended exposure to ultraviolet (UV) radiation, precipitation, chemicals that are strong acids or strong bases, flames, sparks, temperatures in excess of 71 deg C (160 deg F)m and any other environmental condition that might damage the HPTRM.

1.7 QUALITY ASSURANCE SAMPLING, TESTING, AND ACCEPTANCE

A. HPTRM shall be subject to sampling and testing to verify conformance with this specification. Sampling for testing shall be in accordance with ASTM D 4354.

B. Acceptance shall be in accordance with ASTM D 4759 based on testing of either conformance samples obtained using Procedure A of ASTM D 4354, or based on manufacturer's certifications and testing of quality control samples obtained using Procedure B of ASTM D 4354.

C. Quality Assurance Sampling and Testing will be waived for ISO 9001:2000 Certified Manufacturing Facilities. Documentation of ISO 9001:2000 Certification shall be provided upon request.

2 PRODUCTS

2.1 MANUFACTURERS

All components of the ARVS shall be furnished by a single manufacturer as a complete system.

A. Substitutions: For consideration, alternate systems meeting the material specification must also have a documented history of ARVS installations totaling more than 350,000 square yards and have been in the marketplace for more than three (3) years. Past project documentation will be required for submittal for evaluation to include project name, date of installation, owner's contact information and size of the project.

2.2 MATERIALS

A. HPTRM:

1. Three-dimensional, lofty woven polypropylene RECP specially designed for erosion control applications on levees, steep slopes, and vegetated waterways.

2. Matrix composed of Trilobal monofilament yarns woven into uniform configuration of resilient pyramid-like projections that minimize watering requirements while enhancing vegetation establishment.

3. Must be a homogeneous matrix, and not comprised of layers, composites, or discontinuous materials, or otherwise loosely held together by stitched or glued netting.

4. The woven matrix of Trilobal yarns must be heat-set to improve interlock and minimize yarn displacement around anchors and pins, which also results in greater flexibility for improved conformance to uneven surfaces.

5. Material is to exhibit very high interlock and reinforcement capacity with both soil and root systems and demonstrate high tensile modulus.

6. The HPTRM should meet the following values:

Property	Test Method	Test Parameters	Units	Property Requirement
Mass Per Unit Area [1]	ASTM D-6566	Minimum	g/m^2 (oz/yd^2)	457.7 (13.5)
Thickness [1]	ASTM D-6525	Minimum	mm (in)	10.2 (0.40)
Light Penetration [1] (% Passing)	ASTM D-6567	Maximum	percent	15
Tensile Strength [1]	ASTM D-6818	Minimum	kN/m (lb/ft)	58.4 x 43.8 (4,000 x 3,000)
Tensile Elongation [1]	ASTM D-6818	Maximum	percent	40 x 35
Resiliency [1]	ASTM D-6524	Minimum	percent	80
Flexibility [2, 3]	ASTM D-6575	Maximum	mg-cm (in-lb)	615,000 (0.534)
UV Resistance [2]	ASTM D-4355	Minimum	percent	90 at 6000 hrs

Note:

1. Minimum Average Roll Value (MARV).

2. Typical Value.

3. A smaller value for flexibility denotes a more flexible material.

7. Performance Properties: In a vegetated state, the HPTRM must demonstrate acceptable performance (as defined by the Engineer) when subjected to at least 0.5 hrs of continuous flow producing the following conditions.

   a) Permissible velocity: 7.6 m/sec (25 ft/sec)

   b) Permissible tractive force (shear stress): 0.766 kPa (16 psf)

   c) Performance may be demonstrated by:

      1) Flume testing at an independent facility under conditions similar to this project provided that the manufacturer can demonstrate that the material tested is functionally equivalent to the material being supplied. This may be demonstrated by providing index property test results (listed in 2.2.A.4) from a GAI-LAP accredited laboratory for both the tested and supplied materials.

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2) A documented case history of successful performance (as defined by the Engineer) at an installation similar to this project where (documented) hydraulic forces met or exceeded the requirements listed above provided that the manufacturer can demonstrate that the case history material is functionally equivalent to the material being supplied. This may be demonstrated by providing index property test results (listed in 2.2.A.4) from a GAI-LAP accredited laboratory for both the case history and supplied materials.

8. Manufacturing Quality Control: Testing shall be performed at a laboratory accredited by GAI-LAP for tests required for the HPTRM, at frequency exceeding ASTM D-4354, with following minimum acceptable testing frequency:

Property	Test Frequency (yd^2)
Mass Per Unit Area	1/13,125
Thickness	1/13,125
Light Penetration (% Passing)	1/13,125
Tensile Strength	1/13,125
Tensile Elongation	1/13,125
Resiliency	1/36,750
Flexibility	1/36,750
UV Resistance	Annually

2.3 ANCHORING DEVICES

A. Securing Pins:

1. Securing pins should be at least 5 mm (0.20 in.) diameter steel with a 38 mm (1.5 in.) steel washer at the head of the pin. Securing pins should be driven flush to the soil surface.

2. Length: 300 to 600 mm (12 to 24 inches); sufficient ground penetration to resist pullout.

3. Placement: The pins provide for temporary tie-down of the HPTRM to the slope to aid with vegetation establishment. Locations of the pins along trenches are indicated in the drawings at the center of the 0.3 m x 0.3 m (1 ft x 1ft) trench spaced 0.3 m (1 ft) apart. Locations of the pins along the vertical overlaps are spaced 0.3 m (1 ft) apart. HPTRM rolls wider than 3.2 m (10.5 ft) must not have a pin spacing greater than 0.45 m (1.5 ft) in any direction to minimize wrinkling of the material common to wide roll width geosynthetics and the loss of intimate contact beneath the HPTRM.

4. Heavier metal stakes may be required in rocky soils

5. Depending on soil pH and design life of the pin, galvanized or stainless steel pins may be required.

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B. 3' PDEA:

1. PDEA with a minimum drive depth of 36 inches are used to provide for permanent tie down of the HPTRM in locations specified in the drawings.

2. The PDEA components shall be made of materials suitable to resist corrosion and UV degradation particularly at the soil/air interface, and strategically selected to achieve an expected design life of 50 years.

3. The anchor head shall have smooth edges and shaped in a bullet like configuration with the driving end tapering to a rounded point, minimizing abrasion and installation damage to the HPTRM.

4. The top load bearing plate shall have openings allowing vegetative growth through the plate and protrude only about 0.2 inches above the surface of the mat after installation. The plate shall also include a recessed cavity so that the cable can be cut below the plate surface.

5. For quality control purposes and warranty claims, PDEAs should be delivered to the jobsite fully assembled and ready for installation, and meet the following requirements:

Component	Standard(s)	Material Composition	Physical Properties
Anchor Head (Bullet Nose)	ASTM B-85	Aluminum A383 Alloy (Gravity Die Cast)	Width: 25mm (1.0in.) Length: 84mm (3.3in.) Bearing Area:16cm^2 (1.5in^2) Weight: 45grams (0.1 lb.).
Cable Tendon	ASTM A-1023	Zinc-Aluminum Coated Carbon Steel	Diameter: 3mm (0.12 in.) 1X19 Strand Construction
Load Bearing Plate	ASTM B-240-10	Die Cast Zinc with an Eight (8) Opening Array; Utilizing a Ceramic Roller & Directional Locking Device	Diameter: 108mm (4.25 in.) Thickness: 2.5mm (0.1in.)
Tendon Sleeves	MS51844	Zinc-Aluminum	Length: 15.875mm (5/8") in Wall Thickness: 4.8mm (3/16")

6. Performance

Performance Property	Value
Cable Tendon Working Load Strength	3.56 kN (0.8 Kips)
Cable Tendon Yield Strength	4.89 kN (1.1 Kips)
Composite Anchor Load Strength*	2.22 kN (0.5 Kips)
Minimum Anchor Drive Depth	0.91m (3.0ft.)
Maximum Anchor Drive Depth	1.52m (5.0 ft.)

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* Anchor performance is a function of insitu soil strength and therefore the load range in this specification should be regarded as a guide only. Site specific soil conditions shall be evaluated by a licensed geotechnical engineer to determine the anchor type, depth, and pattern to resist slope instability. Pre construction pull tests may be recommended.

C. 5' PDEA:

1. PDEA with a minimum drive depth of 60 inches are used to provide for permanent tie down of the HPTRM in locations specified in the drawings.

2. The PDEA components shall be made of materials suitable to resist corrosion and UV degradation particularly at the soil/air interface, and strategically selected to achieve an expected design life of 50 years.

3. The anchor head shall have smooth edges and shaped in a bullet like configuration with the driving end tapering to a rounded point, minimizing abrasion and installation damage to the HPTRM.

4. The top load bearing plate shall have openings allowing vegetative growth through the plate and protrude only about 0.2 inches above the surface of the mat after installation. The plate shall also include a recessed cavity so that the cable can be cut below the plate surface.

5. For quality control purposes and warranty claims, PDEAs should be delivered to the jobsite fully assembled and ready for installation, and meet the following requirements:

Component	Standard(s)	Material Composition	Physical Properties
Anchor Head (Bullet Nose)	ASTM B-240-10	Zinc-Aluminum Alloy (Pressure Die Cast)	Width: 31mm (1.22in.) Length: 87mm (3.44in.) Bearing Area:19cm^2 (3.0in^2) Weight: 110grams (0.24 lb.).
Cable Tendon	ASTM A-1023	Zinc-Aluminum Coated Carbon Steel	Diameter: 3mm (0.12 in.) 1X19 Strand Construction
Load Bearing Plate	ASTM B-240-10	Die Cast Zinc with an Eight (8) Opening Array; Utilizing a Ceramic Roller & Directional Locking Device	Diameter: 108mm (4.25 in.) Thickness: 2.5mm (0.1in.)
Tendon Sleeves	MS51844	Zinc-Aluminum	Length: 15.875mm (5/8") in Wall Thickness: 4.8mm (3/16")

6. Performance

Performance Property	Value
Cable Tendon Working Load Strength	3.56 kN (0.8 Kips)
Cable Tendon Yield Strength	4.89 kN (1.1 Kips)

Composite Anchor Load Strength*	2.22 kN (0.5 Kips)
Minimum Anchor Drive Depth	0.91m (3.0ft.)
Maximum Anchor Drive Depth	1.52m (5.0 ft.)

* Anchor performance is a function of insitu soil strength and therefore the load range in this specification should be regarded as a guide only. Site specific soil conditions shall be evaluated by a licensed geotechnical engineer to determine the anchor type, depth, and pattern to resist slope instability. Pre construction pull tests may be recommended.

3 EXECUTION

3.1 PREPARATION

A. Grade and compact areas to be treated with ARVS (compacted as indicated or as directed by Engineer). Subgrade shall be uniform and smooth.

B. Remove large rocks, soil clods, vegetation, and other sharp objects so that the installed mat will have direct contact with the soil surface.

C. Prepare seedbed by loosening 50 to 75 mm (2 to 3 in) of soil above final grade. This may be accomplished with a rotary tiller on slopes 3H:1V or flatter.

D. Select and apply soil amendments, fertilizer, and seed (if applicable), (in an amount equivalent to 50% of the total mixture required to be installed on the soil surface) in accordance with Section SEEDING AND SODDING, to scarified surface prior to installation of ARVS. Do not mulch areas where mat is to be placed.

E. Keep areas moist as necessary to establish vegetation. When watering seeded areas, use fine spray to prevent erosion of seeds or soil. If as a result of rain, prepared seedbed becomes crusted or eroded, or if eroded places, ruts, or depressions exist for any reason, rework soil until smooth and reseed such areas.

F. Excavate a Crest of Slope (COS) trench 300 mm (12 in.) wide by 300 mm (12 in.) deep, a minimum of 900 mm (3 ft.) over the crest of the slope. Excavate a Toe of Slope (TOS) trench 300 mm (12 in.) wide by 300 mm (12 in.) deep, a minimum of 900 mm (3 ft.) past the toe of the slope.

3.2 INSTALLATION

A. Install ARVS at elevation and alignment indicated.

B. Beginning at downstream end of the slope, place initial end of first roll of HPTRM into the COS trench and secure with securing pins at 300 mm (12 in) intervals in between PDEAs at 1.2 m (4 ft.) intervals.

C. Unroll the HPTRM down the slope and secure the HPTRM end in the TOS trench with securing pins at 300 mm (12 in) intervals in between PDEAs at 1.2 m (4 ft.) intervals.

D. Position adjacent upstream rolls in same manner, overlapping preceding roll minimum 75 mm (3 in) until the armoring limits are completed securing the overlaps with securing pins at 300 mm (12 in) intervals in between PDEAs at 1.5 m (5 ft.) intervals.

E. Backfill and compact the trenches with specified soil or as directed by Engineer.

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F. Secure HPTRM to the slope with securing pins at a frequency of 2.5 pins per square meter (2 pins per square yard) and PDEAs at a frequency of 0.6 anchors per square meter (0.5 anchors per square yard). Increased anchoring frequency may be required if site conditions are such that the Engineer determines it necessary.

G. Alternate installation methods must be approved by Engineer prior to execution.

H. Soil fill and sod/seed the ARVS:

1. Installed ARVS shall be seeded (or re-seeded) and soil filled, OR sodded as required by the project documents.

2. Rubber-tired vehicles must be used, and sharp turns avoided. No heavy and/or tracked equipment or sharp turns are permitted on the installed HPTRM. Avoid ANY traffic over the HPTRM if loose or wet soil conditions exist.

3. Do not place excessive soil above material.

4. Broadcast additional seed or mulch (if applicable) above soil-filled mat and irrigate as necessary to establish/maintain vegetation

END OF SECTION

ANCHOR REINFORCED VEGETATION SYSTEM FOR NON-STRUCTURAL EROSION CONTROL ON SLOPES